DATAMATION

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IBM's Printer Promise

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WHEN TO TEAR DOWN YOUR INFO CENTER

IBM-FUJITSU AFTERMATH: THE CODE WARS

SOLIDARITY COMPUTES! INSIDE THE POLISH UNDERGROUND

DATAMATION

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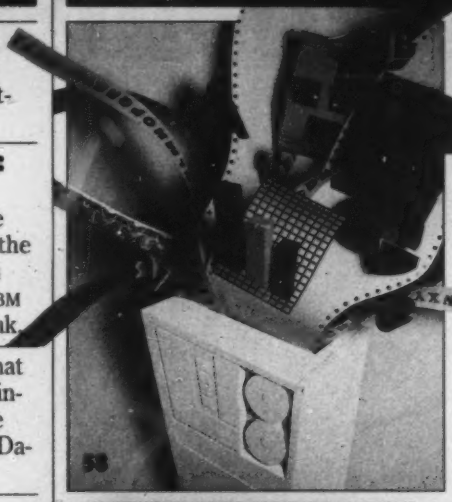

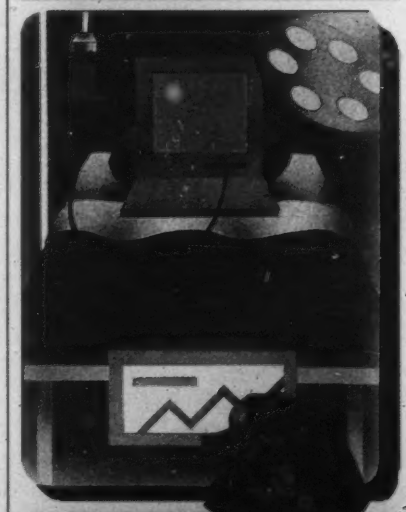

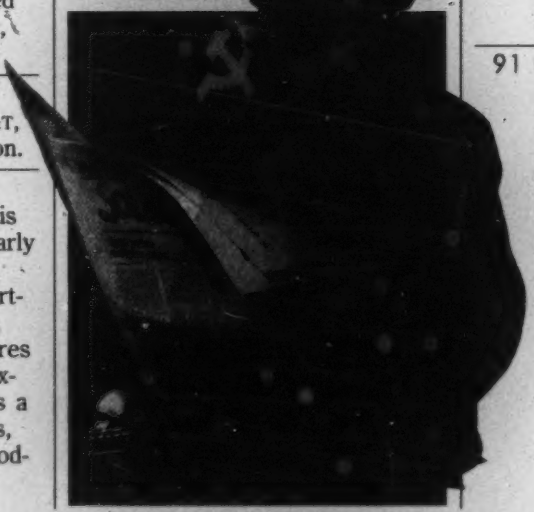

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1987 JESSE H. NEAL AWARD

Editorial

Speeding Toward 1988, Slouching Toward 1989

Economic forecasts no doubt are creeping into your IS budget planning sessions as your company prepares to do business in 1988 and beyond. The National Association of Business Economists predicts that the U.S. economy will continue to grow moderately next year and will fall into a recession in 1989.

Should such forecasts be barred from entry?

No, the ceos and cfos who ultimately approve IS budgets will insist. Why should investments in pcs, PBXs, database software, and maintenance be exempted from the tried-and-true methods of planning corporate outlays—especially since they now account for nearly 38% of all U.S. capital spending?

Maybe, says Cahners Publishing Co. economist Robert Stewart. "Spending on computers and communications should not be business-cycle driven," he says. "It should depend on secular, long-term trends." Stewart sees information technology as vital to U.S. companies' efforts to remain competitive and regain their edge in the global marketplace.

Then again, maybe not, say the IS execs who respond annually to the DATAMATION/Cowen & Co. surveys on mainframe, mini, micro, and communications purchases (the latest results will appear in our next issue). Since 1982, there's been a steady decline in the growth of hardware budgets at end-user sites. In the next three to five years, they expect annual budgets to increase only 7.8%—a number frighteningly close to the increases expected yearly in all capital spending.

Does the trend suggest that systems are simply becoming another type of equipment a company buys, the same as a fleet of trucks or an order for lathes?

We hope not. We want to believe the trend merely reflects the improvement in price/performance afforded by advances in technology. We want to interpret these spending patterns to mean that customers are spending more resources on software, especially applications that take advantage of 32-bit chips, 1Mb memories, and networking standards. And we want to think that today's IS execs, ceos, and cfos are smart enough not to lump systems investments in with capital spending outlays dictated by economic cycles.

There's a big difference between T1 trunks and trucks, LANs and lathes. Recognizing the difference is important to your company's future. Maybe it should spend big on systems in 1988. Maybe it should invest even more in 1989—regardless of a recession.

Tim Mead

TIM MEAD
EDITOR-IN-CHIEF

DATAMATION

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Letters

Troubling Weaknesses

Jeff Moad's Behind the News article, "As AIDS Spreads, State Pc Systems Are Reaching Limits," (Aug. 15, p. 43) reported troubling weaknesses in the computerized information processing and transfer of AIDS and HIV test results. These primarily microcomputer-based systems reportedly have problems with operational security, confidentiality, and system loads. Yet the details suggest that there is a lesson to be learned from this.

Given the focus on security and confidentiality, the methods reported are curious. The AIDS Reporting System uses an "encoding device" called "Soundex," creating a key identifier from the patient's name, location, and date of birth. Soundex is a well-known algorithm for facilitating data searches, not for restricting access. Add to this the location and birth date of the patient, and one has all the information in a key value that a prospective intruder needs to invade someone's privacy without too much work. Yet the described systems avoid encryption techniques or even password protection of the data files. If confidentiality is an important factor, why use a key that is unnecessarily rich in information without benefit of an unrelated encryption technique?

We would make two inferences from this article. First, the article's attention to security and protection of privacy is disproportionate to the attention given these issues by the developers of any of the systems discussed. The security is, in fact, comparable to what would be applied to much less sensitive information: locking up the computer system and hoping that nobody will make a deliberate effort to learn what's in it.

Second, considering the techniques used (and those not used) and the solvable but still outstanding problems in these systems, we infer a cavalier treatment of software development. We'd guess that the test recording and reporting systems were developed in an end-user filing system like dBase or Clipper (which, incidentally, supplies Soundex as a language feature which any buyer of these products can apply without programming expertise). These environments do provide quick and easy data storage and reporting facilities, but they are very weak in the ways that the AIDS and HIV data systems are reportedly weak: procedural control, security, and efficiency. Moreover, it is typical for the "design" of systems with these tools to evolve "on the fly" because users let the environment define the problem rather than analyze it abstractly. To us, it is inconceivable that a competent analyst would perceive confidentiality as a serious concern and then develop a system in the ways described in your article. It is very conceivable that one would slap together a filing and reporting system in this manner, and then backpedal to cover security.

In summary, we read a story between the lines. You report that "privacy has been largely maintained" in a sensitive area of computerized information management, but give evidence that this is largely fortuitous. You describe a mandated nationwide system of confidential information transfer, but give evidence that the planning and coordination of this network is minimal. You report on systems strained by their load, but give evidence that they are handicapped by design. Those who worry about privacy and civil liberties in the information age will find no solace in your news.

STEPHEN MILLS
Director of Software Development
The Memory Bank Inc.
Salisbury, N.C.

Portables

In your excellent story on portable computers ("Portable Possibilities," Aug. 15, p. 93), Connie Winkler notes that the best screen technology is gas plasma, "which has the highest resolution and, thus, greatest readability. But some portability is lost: plasma screens require an AC outlet."

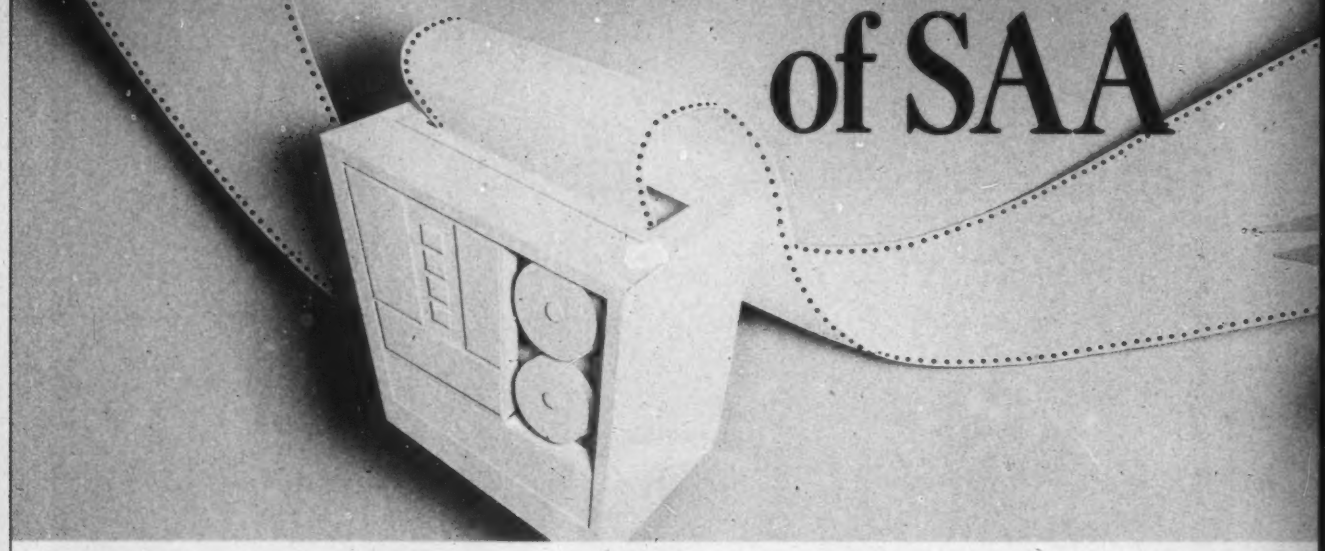
Grid Systems Corp. manufactures laptop portables with plasma screens that don't require an AC outlet. Grid has been offering gas plasma screens on battery-powered laptop portables since the introduction of the GridCase in April 1985. In fact, Grid also has systems with both a plasma screen and internal hard disk.

The plasma screen, among other benefits, allows users to make powerful, graphically crisp business presentations and is a strong selling point of our systems. Our customers say they are especially pleased because they didn't have to sacrifice true portability to get a high-quality screen.

BARRY MARGERUM
Vice President, Marketing
Grid Systems Corp.
Fremont, Calif.

IBM will be left with ink on its face unless it can quickly address the problem of producing documents that merge text with graphics. IBM's answer, which is still two to three years away, is System Application Architecture (SAA). This new group of software standards and conventions presents a slew of problems to users who must decide which printer to buy.

The Printer Promise of SAA



BY HESH WIENER
AND SHARON BRADY

At the biggest banks, the wealthiest stockbrokerages, and the most immense insurance companies, getting new business forms into production is still a hassle. Even though these giants have multimillion-dollar mainframes, $250,000 printers, and more terminals than Greyhound Bus Lines, they can't easily crank out compound documents that contain both text and graphics.

Acutely aware of this and a host of related problems, IBM has proposed its Systems Application Architecture. SAA promises to help mainframe users process an array of compound documents such as invoices, statements, and sales call reports.

The most optimistic observers predict that a substantial part of SAA will be in place within the next two to three years. That will be a long time to wait for users who already feel that IBM is late in providing support for compound documents.

"Setting up a new form can take four to six hours," complains Tony Durante, vice president at Wall Street Data Services (WSDS), the New York computer service bureau owned by Wall Street Trust Co., part of the Bank of New York. "Of course, some changes can be done in 10 minutes, but those are the exceptions," points out Durante.

So for now, WSDS staff must code its graphics piece by piece. Durante's shop has two of the biggest page printing systems on the market, IBM's 3800-3 and Xerox's 9700. Currently, only the Xerox hardware is used for jobs involving graphics. The graphic elements, which are coded via a micro that sits on top of the 9700, are merged with a data stream from a 3090 mainframe that's not even located in New York, but at the other end of a T1 line that reaches across the Hudson River from a Teaneck, N.J., computer center. WSDS's 3800 printer, which is currently used as a very fast line printer, may also be producing graphics output next year.

At Chase Manhattan Bank in New York, all of the graphics images produced by its 3800 for its forms are generated photographically, with one exception. Chase prepares transparencies that are flashed on its 3800's imaging belt as it prints text. "The one form that was coded," explains Chase vice president Gary Neville, "was done years ago. The disclosure material required on most of the output we send to customers is best prepared on preprinted forms anyway. But all of us in banking would like to get away from expensive color printed forms if the technology would let us."

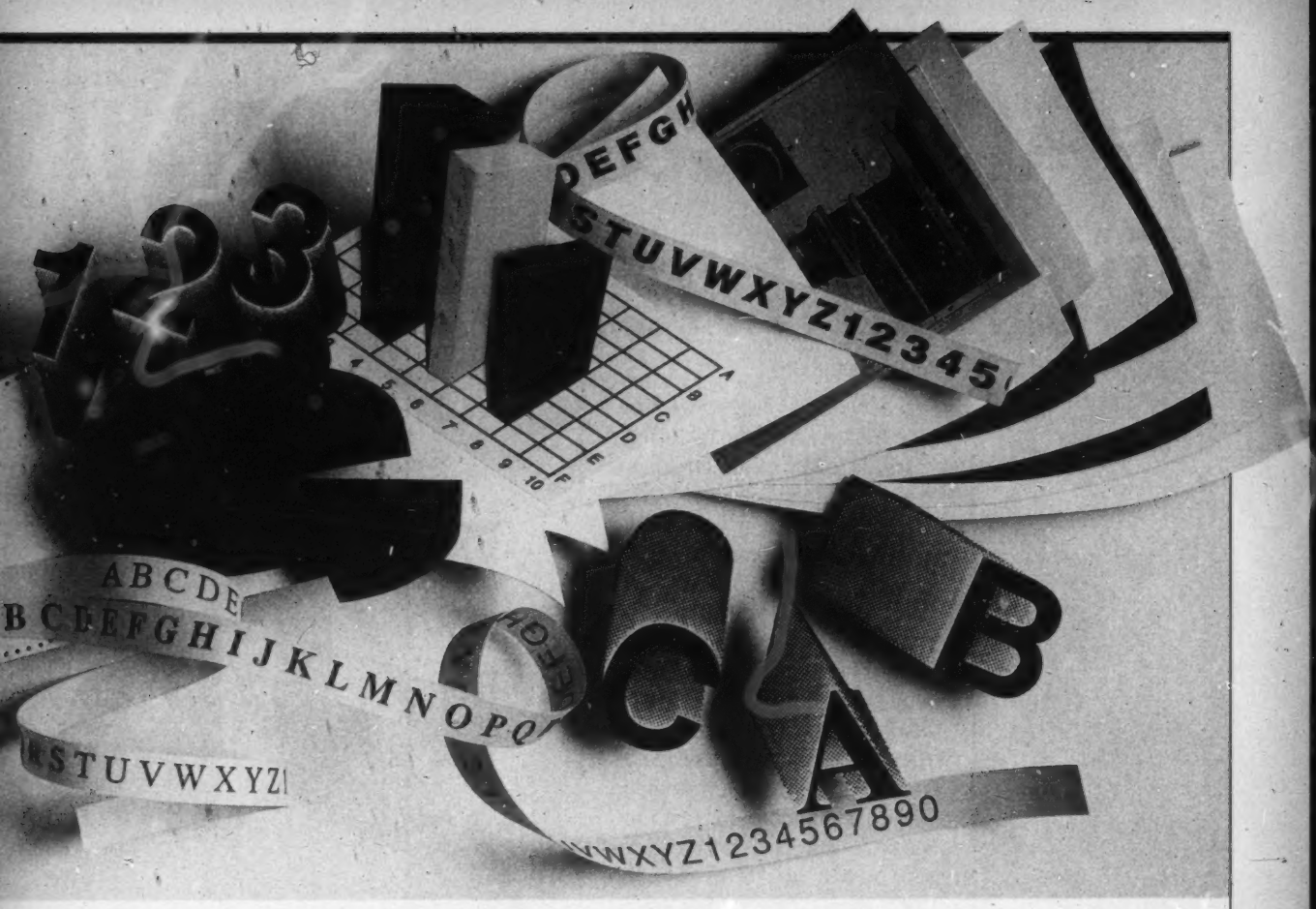
Destined to Reshape the World

SAA is the technology that IBM is banking on to fill this bill. Not really a program but a bundle of software standards and conventions, SAA is still not fully defined. But like SNA, SAA is destined to reshape the world in which users must work. That reshaping process is expected to start next year, after IBM provides its first implementations of SAA.

While most of SAA remains a mystery, one thing is certain: line printers are dead under SAA, which will support only page printers. All of IBM's software will be rewritten with SAA in mind, a chore that could take some time. Nevertheless, users who have been given a peek at unreleased products forecast that SAA will be everywhere in a couple of years.

"IBM sets the standards," asserts Joe Hodge, vice president for information systems at Hospital Corp. of America in Nashville. "If it dallies, someone else just might move up to take its place."

Paper sculpture by Bill Fineweod



Big Blue, however, is not about to let that happen. Because the stakes for user dollars are high, Hodge claims that IBM "really has its act together" for the launch of SAA. Hospital Corp. of America is also gearing up for SAA. It is actively building systems that will use SAA and related standards to bind its PS/2s, minicomputers, and mainframes into a coherent network.

IBM has quickly picked up on the network angle. In fact, SAA is IBM's way to make it easier for programs to interchange data, and to move that data among diverse network nodes. It will help users link a variety of computers that support many different terminals and printers.

All of IBM's software will be rewritten with SAA in mind, which could take some time. But users who've seen unreleased products predict SAA will eventually be everywhere.

One of the key aspects of SAA is that it will define full printer support only for all-points-addressable printers. On large systems, all-points-addressable printers are based to an overwhelming degree on laser-xerographic techniques, although other technologies, such as ion deposition, may yet come into play. IBM's 3800-3 printer is the de facto standard in the IBM mainframe market, which certainly simplifies the giant's problem of providing support for compound documents. The 3800-3 can produce graphics along with text, a capability IBM calls Advanced Function Printing, or AFP.

Alternatives to the 3800 at the high end of the page printer market either emulate the 3800-3 hardware or understand AFP print commands. Siemens' printers and those it makes for StorageTek emulate the 3800-3, while Xerox's machines work at the AFP level.

There are, however, quite a few mainframe users with printing subsystems that do not conform to IBM's 3800-3 AFP specifications. Users of these printers will have to change or face the fact that they will be denied entry into the SAA software environment. This may not be a consideration for IS users with old printers that will be replaced before SAA becomes part of their software scene. But it is a factor that must be weighed by all users planning to install printers in the near future. Printers purchased today are likely to be around for five to 10 years—a period during which IBM, as slow as it may be in making good on all its promises, is certain to have made SAA a standard.

Today's mainframe users have only a handful of page printing systems from which to choose. But whatever brand they select, the issues involved in conforming a high-end printer to SAA will have to be addressed by their vendors, who have a significant interest in keeping users happy.

Beyond the boundaries of the mainframe world, where a multitude of printers offer the capability of drawing a page dot by dot, things are much less certain. Although IBM's own printers may be the first to meet its graphics standards, some of those models may even become obsolete as its product lines evolve. Printer makers, software developers, or even users will be left with the tiresome task of retrofitting printers to con-

Mainframe users with line printers won't be able to upgrade programs to the SAA standards.

HOME INSURANCE'S GRAFFEO: IBM has got to come through on SAA.

form to the new norms.

Some manufacturers will do a better job than others, and sooner. Those that want a piece of the action will soon have to decide just how much SAA will affect their customers. If they want in, they will have to modify their products or develop software that translates output generated in IBM formats to their native commands.

Xerox, with its broad line of nonimpact printers, is pursuing a dual strategy. On the one hand, it has defined its own end-to-end set of standards, called Xerox Document Printing Architecture. Within that architecture, it's also defined a standard data stream it calls the Xerox Printer Access Facility. On the other hand, the company cannot afford to walk away from a huge installed base of machines that are driven by IBM mainframes. Xerox has said it will continue to support IBM's AFP while keeping an eagle eye on any other SAA-related conventions that its customers may want.

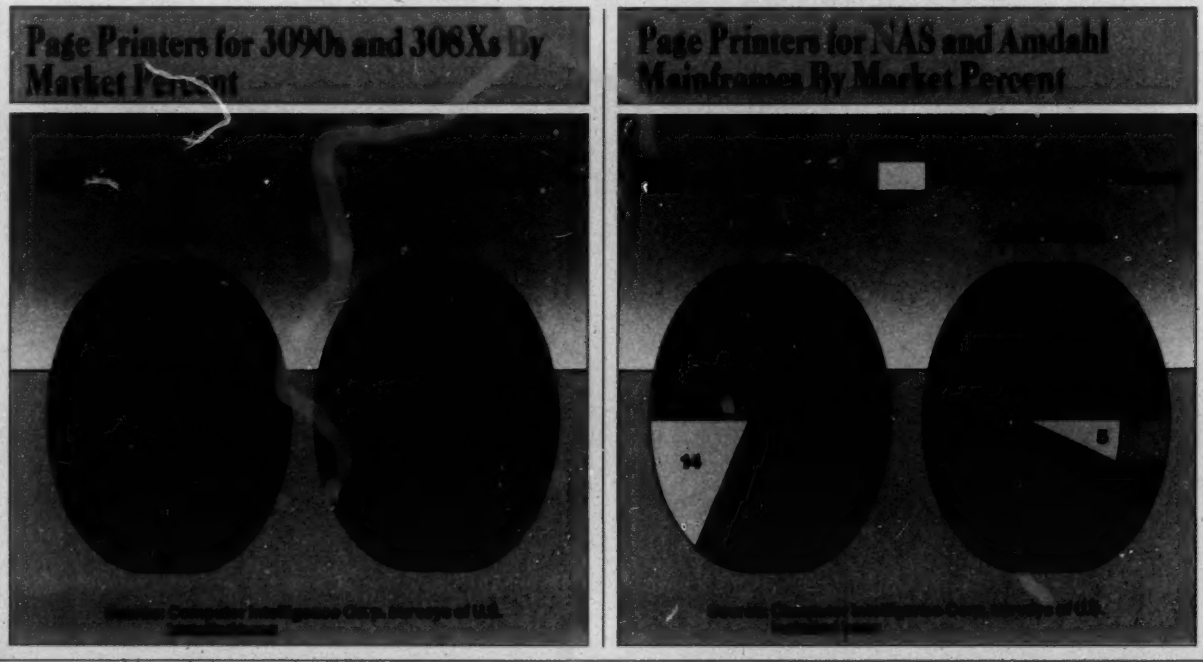
Users creating documents on Xerox terminals that are shipped to Xerox printers via IBM computers will have to decide which standards they want. In mainframe shops, the odds favor IBM's standards.

Game Rules Will Be Available

While there may be a good deal of work involved in tailoring a printer to IBM's requirements, the rules of the game will be widely available. IBM says its SAA protocols will be open to all vendors. In order to work with SAA, printers will have to support what IBM calls the Intelligent Printer Data Stream (IPDS). This is IBM's generic page description language, the means by which all its software will send information to all-points-addressable printers.

IPDS is not as robust as Palo Alto-based Adobe's PostScript or Xerox's Interpress, two page description languages for publishing applications. It is, however, far richer than any of the device-level commands that are used to tell printers how to position a line of type or when to eject a page.

In addition to content-related data—the stream of characters that must be sent to any printer—IPDS provides the



Charts by Hayes Cohen. Photo by Cristie Holt

FIGURE 1 Market Leaders in Mainframe Page Printers

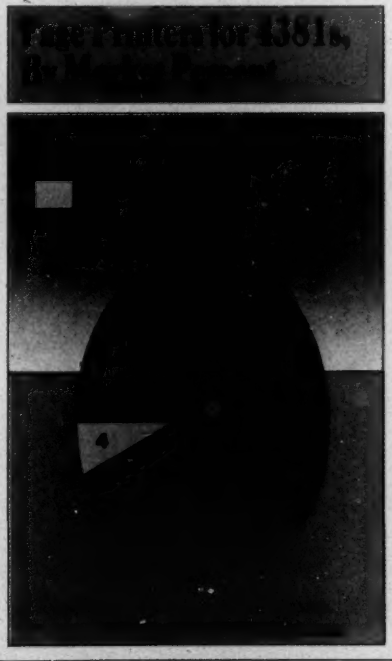
MANUFACTURER AND MODEL	SPEED (PAGES/MINUTE)	RESOLUTION (PIXELS/INCH)	PRICE	MONTHLY MAINTENANCE	PAPER	APA	FIRST SHIPPED
IBM 3800-1	215	180×144	$215,000	$1,500	Fanfold	No	1975
IBM 3800-3	215	240×240	289,000	1,500	Fanfold	Yes	1983
IBM 3800-6	134	240×240	175,000	1,500	Fanfold	Yes	1987
Siemens 2200-2	103	240×240	165,000	695	Fanfold	No	1985
Siemens 2200-3	103	240×240	189,000	695	Fanfold	Yes	1987
Siemens 2300-2	206	240×240	265,000	1,200	Fanfold	No	1985
Siemens 2300-3	206	240×240	283,500	1,200	Fanfold	Yes	1987
Storage Tek 6100	103	240×240	107,000	502	Fanfold	No	1984
Storage Tek 6100	103	240×240	195,000	650	Fanfold	Yes	1987
Xerox 8700	70	300×300	199,000	1,600	Sheet	Yes	1982
Xerox 8790	70	300×300	191,000	1,600	Sheet	Yes	1986
Xerox 9700	120	300×300	375,000	4,000	Sheet	Yes	1977
Xerox 9790	120	300×300	399,000	4,000	Sheet	Yes	1986

Note: Maintenance charges for printers are base prices. In addition, IBM charges $3 for 1,000 feet of output, StorageTek charges $4.30 for 1,000 feet of paper, and Xerox charges $3.20 for 100,000 sheets in excess of 700,000 sheets.

user application with numerous commands that affect graphics and typography. IBM will make these commands as uniform as possible across all its languages and systems.

On mainframes, SAA support will be provided under both the MVS and VM operating systems, on the System/36 and 38 under their standard operating systems, and on the PS/2 line under OS/2. Other operating systems such as PC/DOS will not be part of the initial SAA offering.

For each operating system, IBM will embed SAA in COBOL, FORTRAN, and C. SAA support will also be added to IBM's REXX language under VM and to its application generators. In addition, there will be SAA links in other languages in particular environments. For instance, IPDS is already defined for RPG II on the System/36, and its functions may be invoked through subroutines at sites that have added the appropriate software.



IPDS addresses more options than most printers provide. And even though a printer conforms to SAA, it may not support every possible capability that can be invoked by IBM's commands. (But no matter what, that printer must offer all-points-addressability.) For example, there are features in IPDS that permit the user to specify the color a printer will produce. Such features are still beyond the reach of IBM page printers, which, like Model Ts, print in any color you want as long as it's black.

Other IPDS parameters that will affect the presentation of data sent to a printer include character style and pitch, line spacing, text placement, and angular orientation that allows output to be rotated.

Graphics output on IPDS printers will be controlled by a suite of subroutines that allow applications to define an area that must be filled with a background pattern. Using this capability, a program will select a fill pattern, draw a line or a circle, specify the position of a block text, or print what IBM calls markers and what typographers call dingbats.

There are further embellishments that permit a program to define the thickness of a line and its pattern (dash-dot-dash, for instance). Additional instructions will enable printers to produce bar codes and to select from several common bar coding schemes. In the event that IBM has not spanned all the applications areas and printer types it should support, there is a loophole in the IPDS definition that permits programmers to send control characters directly to a printer.

Despite the breadth of IBM's IPDS definition, there are still quite a few printers that will not be compatible with it. Significantly, as already mentioned, no line printers regardless of make will be supported under SAA, because the standard requires a machine that can put a dot at any point on a page. Line printer mechanisms do not allow for the reproduction of the images that are a major aspect of IBM's scheme.

Most of IBM's midrange systems use line printers or dot matrix printers. Page printers are growing more popular, yet they are common only on systems that are used for word processing applications. The main reason page printers are still not abundant in the midrange is that they cost too much.

Japanese manufacturers, aware of the commercial potential and driven by the need to process their nation's iconic language, have long dominated the low-end page printing market. They are now pushing into the midrange with devices that run at speeds of up to 30 pages per minute.

Some Japanese models also offer resolution of 400 or 600 dots per inch.

The Printer Promise of SAA

This is a substantial improvement over the large IBM and Siemens printers, which are limited to 240-dot pitch. It also beats the top of the Xerox line, which has a resolution of 300 dots per inch.

The Low End Is Split

At the low end, the standards battle may split the market. IBM's SAA and IPDS will have to compete with other established page description schemes, but IBM's ability to set standards in large companies, where PS/2s will be linked to mainframes, will be hard to challenge. Nevertheless, for small users and isolated departments in large organizations, SAA will be less compelling, at least in the short term. That doesn't mean that IBM will concede this turf. Big Blue, as its rivals well know, has never been deterred from pushing its ideas, even when it gets a late start.

Ironically, at the high end, where the company has the most clout, it still does not dominate the page printer market. At the largest IBM and IBM-compatible mainframe shops, the company's page printer market share varies between 23% and 61%, according to Computer Intelligence Corp., La Jolla, Calif. CI's research shows that after IBM, the two most important manufacturers in this market are Xerox and Siemens. Helping Siemens gain its strong foothold is StorageTek, which has installed more Siemens machines in the U.S. than the West German company itself.

Once system users decide to leave the big blue hardware fold, they grow more willing to consider non-IBM page printers.

In other words, the largest users already have hardware in place that can support SAA's IPDS, or at least AFP. That is, so long as IBM's current standards remain in place. If, on the other hand, IBM decides to announce new printers with new capabilities for its high-end mainframes, then the current user base, which includes sites with 3800-3s and other printers, will face some expensive decisions. Given the age of IBM's printer line and the success of IBM's rivals, the need for those decisions seems to be imminent.

The IBM 3800 printer, which began as the model 1, was first shipped in 1975. As far as applications programs are concerned, the 3800-1 is a page-oriented line printer that can be set up to draw forms. Eight years later, in 1983, IBM started shipping its 3800-3, which offered all-points-addressable printing.

Just this year, IBM began installing the model 6, a slower 3800 that also provides all-points-addressable page printing. The two faster 3800s, models 1 and 3, are similar, and IBM will upgrade a model 1 to a model 3 for $95,000.

Xerox, which entered the printer fray in 1977 with its 9700, announced its follow-on 9790 last year. The Xerox machines differ significantly from IBM's. Instead of providing plug compatibility,

BENCH WARMERS.

they offer data stream compatibility.

Xerox printers, which are based on copier engines, move cut sheets instead of the fanfold paper used by IBM's fastest page printers. The Xerox machines also offer significantly higher resolution, 300 dots per inch versus the 240 dots per inch provided by IBM's most expensive printers. Xerox also sells the smaller 8700 and 8790 page printers that are also used on mainframes.

Siemens, which peddles its own machines, the 2300 and the slower 2200, also sells its 2200 through StorageTek. Since 1984, StorageTek has sold the box as its model 6100. These printers are plug compatible with the IBM 3800.

The Bigger, the Bluer

At Members Life Insurance Co. in Farmers Branch, Texas, the coding for fancy output was done several years ago for an IBM 3800 printer. Since then, Members has replaced its IBM iron with Siemens gear. "We didn't have to touch our code," explains Jerry Thompson, vice president of MIS. "It wasn't broke, so we didn't fix it."

The crucial issue is the price/ performance of IBM's next generation of high-end printers in SAA and non-SAA environments.

With so much competition, IBM must fight for every sale, particularly in the midrange. The largest IBM mainframes, the 3090s, are more likely to have 3800 page printers than any other make. Computer Intelligence estimates that 61% of the printers on 3090s are made by IBM, compared with 34% made by Xerox printers, mainly the 97XX models.

The older 308X mainframe shops surveyed by CI are a little less likely to have 3800s. IBM's share here is 54%, compared with Xerox's 36%. All IBM mainframe users have printers from various other makers, but these machines account for only a small piece of the market. These manufacturers, according to CI, have captured a scant 5% of the 3090 page printer base and 10% of the 308X base.

Once users decide to leave the IBM processer fold, they grow more willing to consider non-IBM page printers, too. CI reports that only 42% of the page printers on Amdahl's mainframes are from IBM, while 46% are Xerox machines. StorageTek shows up here with 7%, while various other vendors share 5% of the page printer market for Amdahl mainframes.

Customers of National Advanced Systems, Santa Clara, tend to be somewhat smaller companies with somewhat smaller mainframes than the 3090 or Amdahl machines. As a result, the edge here goes to non-IBM page printers, which are generally not quite as fast as the 3800. CI reports that Xerox has a whopping 49% share of the NAS page printer market, more than twice as much as IBM's 23% penetration. StorageTek has won a

BENCHMARK.

SCS

Scientific Computer Systems Corporation

healthy 14% of this pie, while various other vendors, including Siemens, vie for the remaining 14%.

The pivotal base for all the page printer makers is the IBM 4381 market. The midrange users of IBM's largest air-cooled processors have the reputation of being True Blue. Nothing could be farther from the truth.

Users of the 4381 apparently don't like IBM's page printers nearly as much as those from other makers. CI found that only 33% of the printers on 4381s are from IBM. Xerox has captured an impressive 49% of the 4381 printer market, while Siemens, along with several other printer makers, shares 13% of it. Some 4% of the 4381 shops have gone with StorageTek for their page printers.

As these users migrate to faster processors, they will probably leave their page printers in place. Unless, of course, they are unhappy with the printers they're now using. The result could be serious erosion of IBM's market share among its largest accounts.

IBM's comeback effort, based on the 3800-6, may not be enough to turn around 4381 users. These crucial customers, more so than users of the 3090 and 308X, could force IBM to revamp its page printer line.

Because the major vendors in the market already comply with standards tied to the 3800-3, IBM may not just replace its largest page printer with an equivalent, lower-priced unit. What it may do instead is try to leapfrog the competition by offering a printer that's loaded with a compelling combination of enhancements.

THE 3800-6 MAY NOT BE ENOUGH TO WIN 4381 USERS.

Higher resolution is one obvious possibility, lower cost another. Once IBM announces a new line of fast page printers, its support for the installed base of 3800s and, implicitly, compatible machines, will become a secondary issue. The primary issue, and the one that will most affect the installed base of high-end page printers, is the price/performance of IBM's next generation of machines in both SAA and non-SAA environments.

One company anxiously awaiting SAA to solve its data interchange problems is the Home Insurance Co. in New York. Home Insurance senior vp Tony Graffeo reports that his company is "absolutely, positively going to go with SAA." Echoing the sentiments of many mainframe users caught in the compound document quandary, Graffeo declares, "IBM has got to come through on this."■

Hesh Wiener and Sharon Brady edit newsletters on medium and large systems at Technology News of America, a New York publishing and research firm.

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